Factors for IT-Enabled Public Sector Process Improvements in Developing Economies

Completed Research Paper

Abstract

IT resources are indispensable in the management of Public Sector Organizations (PSOs) around the world. We investigate the factors that could leverage the IT resources in PSOs in developing economies. While research on ways to leverage IT resources in private sector organizations of developed countries is substantial, our understanding on ways to leverage the IT resources in the public sector in developing countries is limited. The current study aspires to address this gap in the literature by seeking to determine the key factors required to create process value from public sector IT investments in developing countries. We draw on the resource-centric theories to imply the nature of factors that could leverage the IT resources in the public sector. Employing an interpretive design, we identified three factors necessary for IT process value generation in the public sector. We discuss these factors and state their implications to theory and practice.

Keywords: *IT Process Value, Public Sector Organizations, e-Government, developing countries, resource-centric theories*

Introduction

An important unanswered question relating to public sector Information Technology (IT) literature is "How do Public Sector Organizations (PSOs) create IT Process Value from IT investments (Belanger et al. 2012)?" This paper seeks to answer this question within a developing country[1] setting by seeking to determine the factors[2] required to source value from public sector IT investments. IT Process Value in the context of this study refers to the contribution of IT and other resources towards improvements in public sector processes. This question remains relatively unexplored as IT studies in the public sector is an emerging and undeveloped area within the Information Systems (IS) domain (Belanger et al. 2012). However, the importance of this question cannot be understated, especially during the current economic conditions where government budgets are being significantly reduced and the public are placing greater expectations on governments.

The study uses the resource-centric theories consisting of the Resource Based View (Barney 1991), Dynamic Capabilities (Teece et al. 1997) and Relational View (Dyer et al. 1998) as the theoretical bases of informing the study's research question. To answer the study's research question, a mixed method research design combining both qualitative and quantitative methods will be used (Gil-Garcia et al. 2006). The study adopts a mixed method approach to answer the study's research question as we first undertake a qualitative exploratory study to identify key factors required for IT process value generation in the public sector of developing countries. The study will then attempt to validate these factors quantitatively through the use of surveys. The study's research design is therefore a two stage sequential mixed method design with the first stage being qualitative and the second stage being quantitative. This paper only discusses the first stage of the study's research design.

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[1] The study uses the World Bank classification for developing countries. The World Bank classifies countries according to development based on Gross National Income (GNI) per capita. The World Bank classifies countries into four income groups being low, lower middle, upper middle, and high-income countries. Developing countries fall in the categories of low and middle-income countries.

[2] We define factors as IT-related capabilities that contribute towards the achievement of a specific outcome. In the context of this study, the outcome is the generation of process value of public sector IT investments.

Interviews were conducted with individuals with significant experience and knowledge regarding e-government in the Pacific. Twenty three individuals from five Pacific Island Countries (PICs) were interviewed. Interpretive analysis of the interview transcripts revealed three key factors for IT process value generation which included an IT-Centric Environment, Dynamic IT Infrastructure and Enhanced IT Integration. These key factors are elaborated on and their implications for theory and practice are discussed.

The rest of the paper proceeds as follows: The next section provides a literature review on IT process value in the public sector; the section following presents the study's theoretical framework; the section following discusses the study's research design, the section following discusses the findings from the study's interpretative stage; the section following summarizes the study's key findings; and the final section concludes the paper.

Literature Review - IT Process Value in the Public Sector

The term 'value' has various dimensions and can be manifested in emotional, social or financial terms. In information systems research, the value people place on IT is one of the most frequently researched questions. Researchers have examined the various value facets of the IT artefact. These include examining how people value IT in terms of its usability and level of acceptance (Venkatesh et al. 2003), the social value people attach to IT (Huysman et al. 2004), public value of IT (Grimsley et al. 2007) and the financial value of IT in terms of the economic contribution to financial performance (Grover et al. 2012). The financial value of IT is more commonly referred to as IT Business value research. This area of research is a well-established field in the information system domain and seeks to assist managers improve the derivation of economic value from IT (Kohli et al. 2008). Studies in this area have primarily been conducted in the private sector. This study focuses on IT process value which is the process improvements created through the use of IT. This value is more relevant in the public sector as the focus is on enhanced efficiency, effectiveness and accountability (Layne et al. 2001; Welch et al. 2005).

IT research in the public sector is broadly classified as e-government (Belanger et al. 2012; Grönlund et al. 2004). Most e-government studies focus on determining citizen satisfaction or acceptance towards e-government technologies (Arrivals et al. 2007; Carter et al. 2008; Srivastava et al. 2009; Titah et al. 2006). The e-government field is relatively undeveloped and in its nascent stage. The overall intent of early e-government literature was designing, implementing and assessing e-government systems in various settings. Primarily for the benefit of citizens and targeted towards investigating how e-government improved service delivery to citizens. E-government was seen as a necessity and no expense was spared by governments. Some studies have sought to understand value propositions of IT in the government (see Belanger et al. 2012 for a review). These included public value, political value, social value and process value. This study specifically investigates the process value of IT investments for the following reasons: (1) Given the complexity and various objectives of the public sector it would be difficult for one study to examine all the various value dimensions of public sector IT investments in great detail (2) process value draws from established area of research within the information systems domain albeit mostly conducted in the private sector (3) process value is more objectively measurable than other value dimensions of IT such as social value and political value (4) process value is also the most pertinent for public sector managers, especially in a time when governments budgets are being slashed and public expectation are increasing. The process value of IT in the public sector refers to how IT contributes towards improvements and enhancements of public sector processes and to overall public sector performance. IT achieves this by enabling greater efficiency and effectiveness of public sector work processes. This in turn leads to enhanced productivity, cost savings and improved service quality. However, IT alone cannot achieve these benefits. Complementary investments in other resources and development of capabilities are also necessary to maximize the process value of IT.

In today's economic environment governments must be more economical in their resource allocations because in the developing world, e-government projects have a high rate of failure (Heeks 2003). PSOs must now rationalize and provide greater justification for IT projects. Also public sector managers must understand how to leverage IT resources to derive the most value from these investments. Thus, understanding on ways to leverage the IT resources in the public sector is a vital prerequisite to meeting the strategic intent, and realize the supposed benefits of public sector IT initiatives to various stakeholders.

Theoretical Framework

The study is informed by the resource-centric theories, which are the Resource Based View (RBV), Dynamic Capabilities (DC) and the Relational View (RV). These theories are the overarching framework that guide and inform on the nature of factors required to leverage the IT resources in PSOs and are rooted in strategic management, economics and legal literature and provide a holistic perspective to examine the complexity of IT process value generation in the public sector. PSOs are essentially a combination of various resources, including the IT resources. The Resource-Based View (RBV) conceptualizes an organization as a bundle of resources (Melville et al. 2004). RBV at its core is a theory of resources and the utilization and coordination of these resources in achieving an entity's overall strategy. A resource-centric lens suggests that a subset of an entity's resources leads to superior long-term performance (Barney 1991). Resources that leverage IT resources are IT-related capabilities. These IT-related capabilities improve public sector processes by enhancing efficiency and productivity.

The achievement of an entity's strategic objectives is also affected by its environment. To cope with changing environments requires entities to be constantly aware of environmental changes and have the ability to respond accordingly. Dynamic capabilities is a theory that stresses the importance of innovation and agility in enabling firms to adapt to rapidly changing environments (Teece et al. 1994). Dynamic capabilities theory is defined as "the ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece et al. 1997)." This theory argues that the greater the rate of environmental change, the greater the dynamic capabilities of a firm will be a source of competitive advantage (Teece et al. 1997).

Developing economies, especially, need to be flexible (Jarvenpaa et al. 1998). The environments in which these economies operate are in a constant state of flux (Kim et al. 1988). PSO's in developing countries also face significant environmental change, some even argue more than the private sector (Pablo et al. 2007). The short-term horizons due to election terms, frequent policy changes and multiple stakeholders create a turbulent environment for the public sector (Boyne 2002). This lack of stability requires PSO's in developing economies to be able to adapt and respond quickly to these environmental uncertainties (Sawyerr 1993). The ability to respond quickly to environmental changes will also facilitate economic development. However, not only is the accumulation of technological investments required but continual innovation needed for economic development (Bell et al. 1993). Innovation is key to process success and is also a necessity for economic development (Fagerberg et al. 2008). IT resources are suited for quickly adapting to environmental changes (Overby et al. 2006). Modern IT technologies such as Web 2.0 and cloud computing provide PSO's in developing economies significant opportunities such as enhanced collaboration, greater flexibility, and innovative solutions (Chang et al. 2008). By leveraging modern IT technologies, PSOs in developing countries will be able to better respond and react to environmental changes.

The RBV and dynamic capabilities theories have broadened our understanding of how organizations can maximize IT process value by effectively leveraging their IT resources. However, these theories have focused on the individual organization as the sole unit of analysis. In today's environment, organizations are becoming more integrated and dependent on each other. Understanding the process value of IT must also employ theories that extend beyond the boundaries of organizations to their process partners. The relational view is one such theory used and while distinct from RBV and dynamic capabilities, the relational view offers a complimentary perspective to these other theories (Dyer et al. 1998). The relational view's unit of analysis is the complex network of relationships between firms (Gulati et al. 2006). The theory emerged from discipline of law when legal scholars were interested in the creation, maintenance of informal contracts between various parties (Baker et al. 2002). The theory has since been applied to economics, strategic management and Information Systems ((Dyer et al. 1998; Lee et al. 2004). The relational view is as relevant for the public sector as it is for the private sector. The public sector is a nexus of contracts. Contracts exist within the public sector between the different divisions such as agencies, ministries, and departments. Contracts also exist between the stakeholders of the public sector such as citizens, the private sector and governments of other countries. IT mediates the relationships that exist both within and outside the public sector by facilitating the exchange and dissemination of information, providing a platform for enhanced communication, encouraging collaboration and allowing the public sector to engage with stakeholders in more interactive ways (Black et al. 2003). The maintenance of these complex networks of relationships is necessary for PSOs to achieve their strategic

objectives. The RBV, dynamic capabilities and relational view provides the theoretical framework to guide and inform this study.

Research Design

A mixed method approach is adopted as e-government is a complex social phenomenon involving technical, institutional and environmental aspects (Gil-Garcia et al. 2006). The high rate of failure especially in developing economies is evidence of the complexity of e-government (Heeks 2003). We employ a two-stage sequential mixed method design. The first stage is an interpretative design and exploratory in nature and the second stage involves the design of surveys to validate key factors identified in stage one. This paper only discusses stage 1 of the study's research design. Our mixed method design begins with an interpretative stage where we explore through interviews the factors necessary for public sector IT process value generation in developing economies. Interpretive research seeks to interpret the shared meanings individuals place on information technology and how they impact and are impacted by information technology (Walsham 1993). The predominant research method used to collect data was semi-structured interviews. Interviews were conducted with individuals in the Pacific with significant knowledge and experience with e-government. These individuals included senior public managers, IT managers and individuals in regional organizations. We selected 5 Pacific Island Countries to draw our interviewees from. These countries were chosen based on proximity and level of e-government investment.

The sampling frame was determined by first identifying PSOs such as the central government IT authority, PSOs with e-government systems and regional organizations. Eleven PSOs and four regional organizations were identified and individuals from these organizations with sufficient experience and knowledge in e-government were then identified by reviewing news articles, web sites and discussion with individuals knowledgeable in the area. Individuals were then further screened based on their level of experience and responsibility. The criteria used were at least 3 years' experience, a senior position that involves managing a team, budget responsibility and involvement in decision making with regards to IT spend. A database was created and emails were sent to these individuals inviting their participation in this study. Two more follow-up emails were sent two weeks apart to individuals who had not responded. At the end of the email invitations, twenty three officials from fifteen PSOs in five PICs agreed to be interviewed. Due to the geographic dispersion of these interviewees, face-to-face, telephone and video conferencing interview methods were used. The interviews were semi-structured in nature. Interviewees were provided with an interview schedule of proposed questions; however, the researcher had the freedom to pose impromptu questions during the interview. All interviews were recorded and transcribed for analysis purposes. Table 1 below provides brief demographic information regarding the interviewees:

Interv. Ref.	Org. Ref.	Count. Ref.	Age	Experience (Years)	Interv. Ref.	Org. Ref.	Count. Ref.	Age	Experience (Years)
T1.	3	3	42	19	*T13.*	11	1	58	13
T2.	14	5	45	20	*T14.*	6	2	60	36
T3.	12	5	49	25	*T15.*	7	1	53	16
T4.	1	4	39	18	*T16.*	1	2	46	12
T5.	8	4	29	7	*T17.*	12	5	58	25
T6.	6	1	46	23	*T18.*	15	4	27	8
T7.	5	4	49	15	*T19.*	2	2	34	5
T8.	11	4	29	8	*T20.*	10	5	60	23
T9.	13	1	35	5	*T21.*	11	4	35	15
T10.	4	4	42	23	*T22.*	1	5	43	12
T11.	9	5	35	16	*T23.*	15	5	35	4
T12.	8	5	44	16					

Table 1. Interviewee Demographics

Interview data gathered was analyzed using the approach described by (Dey 1993). Data was first described in terms of the context, in which it is said, the intentions of the interviewee and the process to which it relates. After description, the broad themes that emerge were classified. The final step involved making connections with the themes and the study's research objectives. The transcriptions and field notes were then analyzed using Nvivo. Transcripts and field notes were entered into Nvivo and then coded for similar themes. The process of coding is a reiterative process and requires the researcher to code and recode text. Finally, key factors related to IT process value generation in the public sector were derived from this data analysis process. The key factors necessary for IT process value generation in the public sector were identified from the key themes. This process was documented in detail from the derivation of themes from interview data to the development of key factors from themes. This was then subjected to review by another member of the research team. The review was conducted to improve the validity and reliability of the findings. Initially five factors were identified but after the review these was reduced to three as the reviewer felt that two factors were redundant and were combined with other factors. Table 2 below summarizes the key factors for IT process value generation in the public sector derived from the interviews and codes from thematic analysis.

Key Factors	Codes (Themes)
IT-Centric Environment	National IT policy, Continuous IT investment, Systematic Workforce Reorganization, Technological Acceptance and Awareness Strategies, IT specific, Continuous IT training, Change Management Strategies, Continual Innovation, Leveraging Web 2.0 Tools and Cloud-based technologies Key Performance Indicators
Dynamic IT Infrastructure	e-Government Applications, Strategic IT Investments, IT Personnel Recruitment, IT Organizational Culture, Alignment to national IT strategic plans, Continuous IT training, Change Management Strategies, Continual Innovation, Leveraging Web 2.0 Tools and Cloud-based technologies
Enhanced IT Integration	Intra-Government Cooperation and Coordination, Stakeholder Engagement, IT-Enabled Regional Integration, Collaborative Environment, Cross-Functional Teams

Table 2. Key Factors and Themes

The following section discusses these key factors.

IT-Centric Environment

Analysis of the interview transcripts revealed that one of the most important cornerstones of successful IT process value generation is an IT-centric environment. This is defined as: An environment and culture that promotes and is conducive to the successful installation, deployment and implementation of IT based solutions in the public sector. Public sector IT investments are not just about changing technologies but about fundamentally changing the way people do things. Radically transforming the government to enhance productivity and improve citizen satisfaction. Two interviewees shared the following:

"Too many times IT projects have failed not because of the technology but because the agencies did not change with changes the technology was bringing. These IT solutions require people with different skill sets, requires new organizational structures, new roles and governance structures. If the organization does not change its workforce in line with technology then I am sad to say that projects will continue to fail. And at the end of the day it is the taxpayers who will have to pay." T8

"A new IT system brings significant change in an organization, be it in the private sector or public sector. IT usually flattens the hierarchical structures of organizations in the public sector. The loss of jobs, creation of jobs, change of roles, etc. must be managed carefully. This new workplace reorganization must be conducted in a systematic and structured approach in order to ensure the organization's workforce fits with the newly introduced IT system." T18

Having a national ICT strategic plan is also critical in promoting an IT-centric culture in the public sector. Two other interviews shared the following:

"The importance of a national ICT strategic plan cannot be understated. Articulating the vision, goals and objectives provides a clear direction to all involved in implementing, deploying and maintaining IT applications in the public sector." T6

"The lack of a national strategic plan is one of the reasons why the implementation of our e-government process has been significantly delayed. Because there was no guide of what to do, people just did anything in an ad-hoc, uncoordinated way. My role is now to try and fix this mess and proper national ICT policies and strategies need to be implemented to ensure that our e-government system is being steered in the right direction." T1

Dynamic IT Infrastructure

The need to leverage IT investments in the public sector was a recurrent theme in the interviewees' responses. While investments in IT are important, interviewees suggested that maximum value of IT investments will be achieved through realization of IT capabilities. Once deployed, these IT-related capabilities will improve public sector processes and translate towards improvements in overall performance. The underlying foundation in which IT capabilities are built on is a Dynamic IT Infrastructure. This is defined as: an IT-backed infrastructure that is strong and secure enough to withstand environmental and external threats but at the same time flexible enough to respond to changes. In today's turbulent environment, dynamic infrastructures based on modern technologies will assist PSO's adapt to constant change. One interviewee shared their experience using the example of Voice Over Internet Protocol (VOIP) following:

"We have just begun using VOIP and Video Conferencing to enhance communication and collaboration within our government departments. VOIP can be accessed even by our provincial departments which are located on the other islands. So now the government is beginning to see the value of VOIP as we have been able to save significant costs because we do not have to physically travel to other locations but can communicate with other officials or departments at our own offices. Now every government officials' contact can be accessed via an online phone directory and they can call anyone in the government instantly. That is if they are there!" T21

Building the core competencies of a dynamic IT infrastructure also requires adequate recruitment of skilled and commitment by top level management. Two interviewees shared the following:

"I believe that there should be appropriate investments in people. Competent and qualified individuals are essential to implement IT solutions within organizations. This all comes down to the recruitment process. I also believe a good organizational culture is important. One which understands the importance of IT and is committed towards implementing IT based solutions." T3

"Management support is vital for the success of IT projects in the public sector. It is these guys on top who set the environment for an IT embracive culture. If they do not believe in IT, then their subordinates will not either. I recall a project in which we replaced a manual system with a computer system in a department. Because the head of that department was supportive of the IT solution, his employees quickly embraced the technology. However, once he left, the employees began using the previous manual system." T12

Enhanced IT Integration

PSOs are a complex network of inter-connected units. The fulfillment of national strategies requires effective coordination of these various units. Lack of coordination and integration between governments departments usually lead to red tape, inefficiencies, and citizen dissatisfaction. IT provides the platform that facilitates communication and collaboration between PSOs. Integrating government systems with IT will create synergistic benefits that will benefit both PSOs and their stakeholders. We term this Enhanced IT Integration and define this as: The integration of PSOs so as to facilitate seamless exchange of information and foster greater collaboration. One interviewee shared the following:

"Government departments do not work in isolation. They work with other government departments, citizens, etc. It was very difficult before when systems were not integrated as it is today. There were so many delays in getting information or for people to respond requests. This leads to increased costs and

many complaints from our key stakeholders. With the new integrated systems, I will not say that everything is perfect, but it has definitely improved." T5

The development of cross functional teams within and with other departments is also necessary for enhanced IT integration. One interviewee shared the following:

"To really evaluate the value of IT we need to closely work with other divisions not only in our ministry but also other ministries such as our central IT department and the Ministry of Finance. Together we can develop matrices of how to evaluate IT investments. Not only whether IT is providing benefits to our ministry but if it's leading to citizen satisfaction and contributing towards the achievement of national goals." T6

One interviewee also felt that greater integration would lead to better decision making at the policy level:

"Right now data is everywhere and data it is inconsistent. We are unable to make sense of the data as we do not know which version is correct. This creates bottlenecks in the policy making process. The overall objective of us moving towards a more integrated government is so that we and the policy makers are able to obtain a single version of the truth. With this, we are then able to obtain more reliable and consistent data to assist us in the formulation of national policies." T21

Conclusion

The value of IT investments to PSOs in developing economies is irrefutable. The level of funds governments and international organizations such as the World Bank are investing in re-inventing public sector through IT provides strong evidence to this claim. The opportunities accorded by IT offer significant possibilities for enhanced public sector service delivery. However, most research on public sector IT investments have been criticized for being normative in nature and lacking strong theoretical grounding (Yildiz 2007). This study seeks to address these issues. Conducting an interpretative approach, the study has identified three key factors for generating the process value of IT in the public sector in developing economies. These findings provide a structured and systematic framework to assist governments, policy makers and public sector managers in developing economies understand how to effectively leverage IT investments to improve the derivation of process value from IT investments. By focusing on these factors, governments in developing countries will be able to improve the success rates of IT projects, obtain greater value from IT investments and pass on these benefits through improved public service delivery to its citizens.

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